

AUSTRALIAN CUMACEA. No. 15<sup>1</sup>

THE FAMILY BODOTRIIDAE (Cont.)<sup>2</sup>

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Fig. 1-9.

THIS paper deals mainly with Western Australian material collected by Dr. A. G. Nicholls, and Messrs. G. P. Whitley, J. Clark, and R. Kenny; notes were previously published<sup>1</sup> concerning the species *Cyclaspis* known to occur off the Indian Ocean coast of Australia. Apart from fifteen members of the last-named genus, two species of the family have been described from Western Australia; eight forms are added herein, the list to date being as follows:

|                                      |                                     |
|--------------------------------------|-------------------------------------|
| <i>Bodotria maculosa</i> Hale.       | <i>Leptocuma nicholli</i> sp. nov.  |
| <i>Eocuma agrion</i> Zimmer.         | <i>Vaunthompsonia nana</i> Hale.    |
| <i>Pomacuma australiae</i> (Zimmer). | <i>Glyphocuma serventyi</i> Hale.   |
| <i>Gephyrocuma repanda</i> Hale.     | <i>Glyphocuma bakeri</i> Hale.      |
| <i>Gephyrocuma similis</i> sp. nov.  | <i>Sympodomma whitleyi</i> sp. nov. |
| <i>Leptocuma serrifera</i> Hale.     |                                     |

Genus BODOTRIA Goodsir.

BODOTRIA MACULOSA Hale.

*Bodotria maculosa* Hale, 1944, p. 226, fig. 1-2.

*Ovigerous female* (Shark Bay, G. P. Whitley, November, 1945; fig. 1, A). Caparace with upper margin, as seen from the side, almost straight but slightly irregular; it is decidedly more than one-fourth of total length of animal, about as wide as deep, and one and three-fourths times longer than deep; dorsum with a low median carina, and sides with a distinct lateral ridge as in male, below which is a less prominent longitudinal fold; the squamose patterning is shallow.

Only a small antero-lateral portion of first pedigerous somite visible; second to fifth somites together a little shorter than carapace, each with a prominent lateral carina; second somite half as long again as third, its dorsal mid-line quite strongly elevated; third to fifth somites each with a median dorsal carina, each elevated at the rear of its somite.

<sup>1</sup> For No. 14 see *Rec. S. Aust. Mus.*, ix, 1948, pp. 1-42, fig. 1-21.

<sup>2</sup> See *Trans. Roy Soc., S. Aust.*, lxxviii, 1944, pp. 225-285, fig. 1-38.

Pleon shorter than cephalothorax (in male it is stouter and is longer than cephalothorax); first to fifth somites with a median dorsal carina which is conspicuous on the first to fourth; these five somites also have a strong longitudinal lateral carina; telsonic somite projecting posteriorly over bases of uropods.

Peraeopods as in the South Australian males previously described, the longer carpal seta of fossorial limbs not nearly reaching to tip of dactylus.

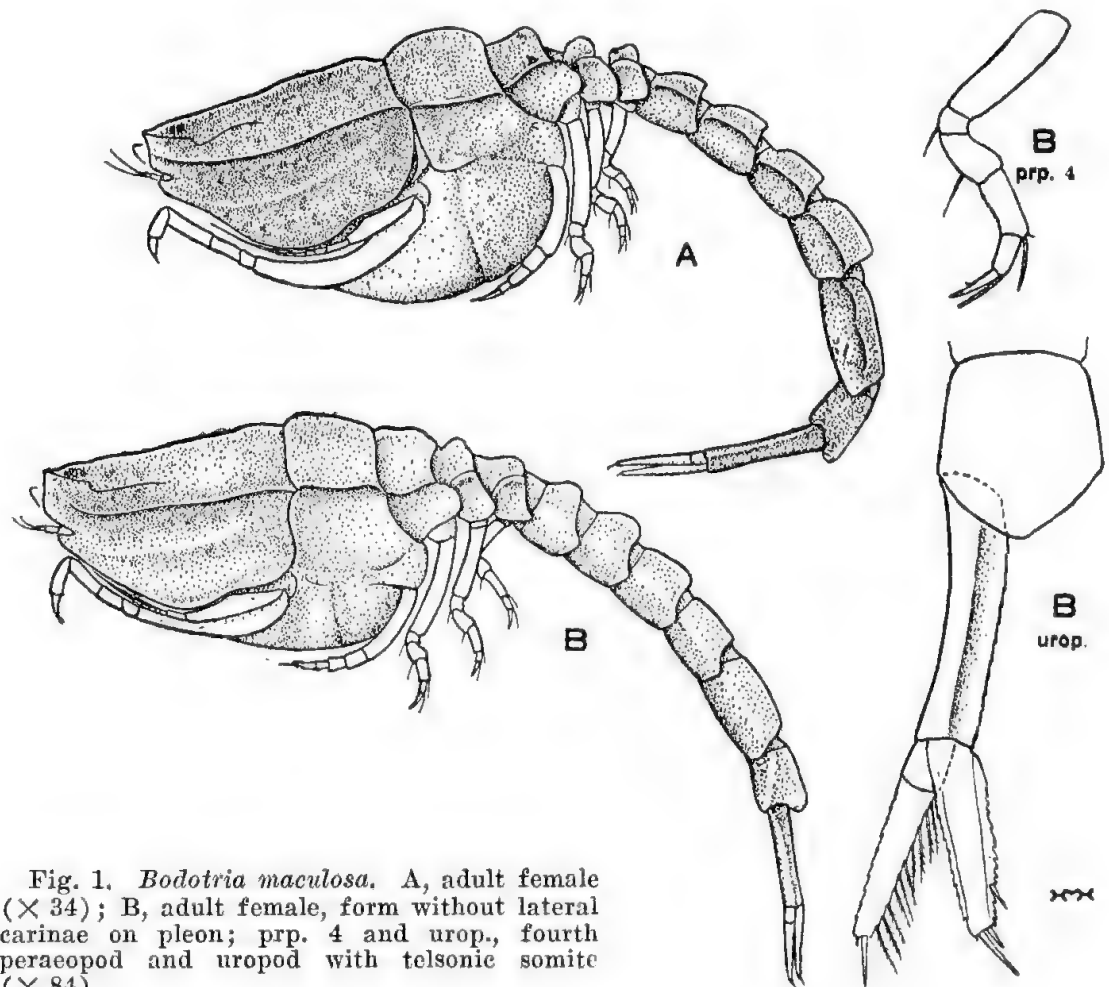


Fig. 1. *Bodotria maculosa*. A, adult female ( $\times 34$ ); B, adult female, form without lateral carinae on pleon; prp. 4 and urop., fourth peraeopod and uropod with telsonic somite ( $\times 84$ ).

Peduncle of uropod half as long again as telsonic somite and fully one-fourth as long again as exopod, which is barely longer than the endopod and bears two unequal spines at the truncate distal end, one spine being insignificant; the endopod is broad (four times as long as wide), has both edges serrate, and bears a single inner spine near the truncate distal end and two unequal terminal spines, the longer of which is less than one-third as long as the ramus and as long as longer terminal spine of exopod.

Colour as in male. Length 3.1 mm.; ova 0.21 mm. to 0.24 mm.

*Ovigerous female* (Houtman's Abrolhos, G. P. Whitley, December, 1945, fig. 1, B; form with no lateral carinae on pleon).

Differs from the female described above in having the median dorsal carinae of the pedigerous and pleon somites less elevated and in the total absence of lateral carinae on the last-named somites. The pitting of the carapace is faint and the lower lateral carina is represented by a low fold, margining a shallow groove. The thoracic appendages and the uropods exhibit no differences.

Length 2.9 mm.

The adult female was previously unknown; as the appendages are identical in the two forms recorded above, both are regarded as referable to *maculosa*. They resemble the female of *pumilio* Zimmer (1921, p. 119, fig. 4-7) from Formosa, but in the Australian species the uropods are distinctive. The antennal notch is narrower, and the dorsal carinae of the pedigerous somites are elevated posteriorly; in *maculosa* the exopod of the uropod is subequal in length to the endopod (including in both the longer of the terminal spines) whereas in the female of *pumilio* the exopod is one-fourth as long again as the endopod.

A large number of specimens, mostly adult males, was collected by Dr. A. G. Nicholls, and Messrs. G. P. Whitley, J. Clark and R. Kenny in and about five Western Australian localities, *viz.*, Houtman's Abrolhos, Rottnest Island, Esperance Bay, Shark Bay and North-West Cape (lat. 21.48 S. to 32.50 S.). Almost all of the males are approximately 4 mm. in length, but there is some variation in the sculpture. In the carapace both lateral and lower lateral carinae may be sharply defined; on the other hand, the shallow pits above the lower lateral carina are sometimes scarcely apparent and the ridge itself barely discernible.

A series of hauls was made at Rottnest Island (J. Clark and R. Kenny) during different periods throughout one night, using a submarine light trap. *B. maculosa* is represented in seven of the samples thus secured, mostly by males 4 mm. or so in length. In the first haul of the evening, however, an adult male and female were taken which are of much smaller size, 2.25 mm. and 2.15 mm. respectively. The little female has the margin of the dorsal crest of the second pedigerous somite, as seen from the side, straight, while the dorsal carinae of pleon somites one to five are fully as elevated as in fig. 1, A.

#### *Eocuma agrion* Zimmer.

*Eocuma agrion* Zimmer, 1914, p. 176, fig. 1-2; Hale, 1944, p. 229, fig. 3-4.

Adult males of this species have now been taken in the following localities: Queensland: Moreton Bay (I. S. R. Munro). Western Australia: Herald Bight

and Broadhurst Bight in Shark Bay, Airlie Island off Onslow, and Eaglehawk Island in Dampier Archipelago (G. P. Whitley); Careening Bay, Garden Island (A. G. Nicholls).

No specimens have been secured off the southern or northern coasts of Australia and the range as at present known is between lat. 27.0 S. and 33.50 S. on the Pacific Coast and between 20.0 S. and 32.0 S. on the Indian Ocean coast.

The mature males vary a little in size in different localities (6 mm. to 7 mm. in Shark Bay; 6.8 mm. to 7.5 mm. at Garden Island). All have the second peraeopod as figured for specimens from New South Wales (Hale, 1944, fig. 4). In the fossorial peraeopods there is usually a shorter and thinner seta, inserted just behind the long carpal seta, which reaches to the tip of the slender dactylus.

GENUS ZENOCUMA Hale.

ZENOCUMA RUGOSA Hale.

*Zenocuma rugosa* Hale, 1944, p. 238, fig. 7, A-D, and fig. 8-9.

A female from Tasmania (middle of D'Entrecasteaux Channel, J. A. Tubb, in Scallop Dredge, April, 1945) extends the known distribution of the species; specimens previously recorded were all taken off New South Wales.

GENUS POMACUMA Hale.

POMACUMA AUSTRALIAE (Zimmer).

*Pomacuma australiae* Hale, 1944, p. 244, fig. 12-14.

The type was taken off Cape Jaubert, Western Australia; G. P. Whitley secured the species in Shark Bay, in 1½ fathoms.

GENUS GEPHYROCUMA Hale.

Two members of the genus, one described as new, occur in Western Australia; it is separated from the two species previously described as follows:

- |    |  |                         |
|----|--|-------------------------|
| 1. | Exopod of third peraeopod unisegmentate .. .. .  | <i>repanda</i> Hale     |
|    | Exopod of third peraeopod bisegmentate .. .. .   | 2                       |
| 2. | Pleon at most barely longer than pedigerous somites together. First segment of endopod of uropod less than twice as long as second .. .. .         | <i>pala</i> Hale        |
|    | Pleon at least half as long again as pedigerous somites together. First segment of endopod of uropod at least four times as long as second .. .. . | <i>similis</i> sp. nov. |

## GEPHYROCUMA REPANDA Hale.

*Gephyrocuma repanda* Hale, 1944, p. 248, fig. 15-16-17, B.

A few examples were secured at Careening Bay, Garden Island, Western Australia (A. G. Nicholls, November, 1946)—lat. 32.8 S. On the eastern coast the species is known between lat. 33.5 S. and 35.22 S. *G. repanda* was described from adult and young males and a juvenile female; adult females are now available.

*Female with embryos in marsupium.* Carapace barely more than two-fifths of total length of animal, less than half as long again as deep, and wider than deep, thus relatively much broader and deeper than in adult male.

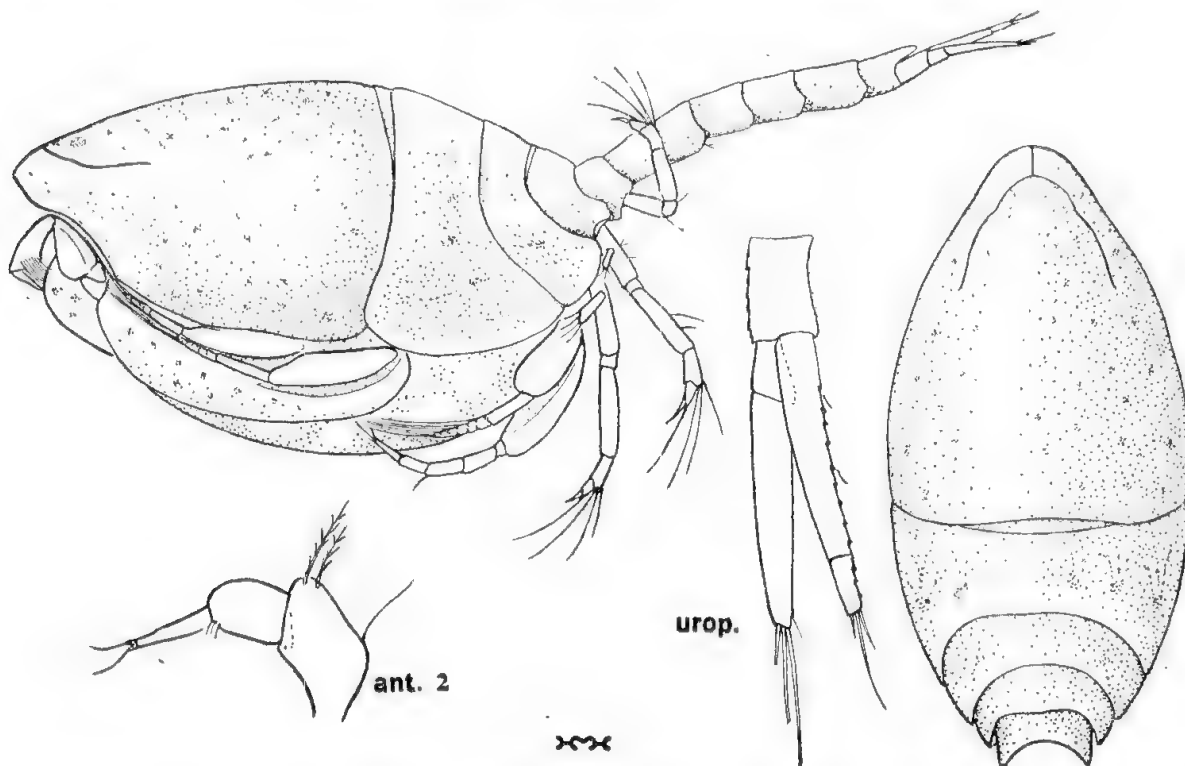


Fig. 2. *Gephyrocuma repanda*. Ovigerous female; lateral view and cephalothorax from above ( $\times 32$ ); ant. 2 and urop., second antenna and left uropod ( $\times 106$ ).

Pedigerous somites all exposed, together fully two-thirds as long as carapace; first somite short and, as in male, concealed on sides; second somite much larger than in male, its pleural length fully half that of carapace.

Pleon a little more than half length of cephalothorax and nearly half as long again as pedigerous somites together.

First antenna with flagellum two-jointed.

Second antenna distinctly three-jointed, the third segment (as in genotype)

elongate, and fully as long as second; the bases of the distal sensory appendages are stout (probably the supposed terminal jointlet in *pala*).

Thoracic appendages as in adult male and with similar exopods (see Hale, 1944, fig. 17, B, exop. prp. 3, and exop. prp. 4).

Peduncle of uropod relatively a little shorter than in male, and with no long inner setae; endopod equal in length to exopod, with its first joint more than three times as long as second; it differs from that of the male in having denticles but no spines on inner margin, but the proportions of its segments are not as in *pala*; exopod with one seta (instead of a row as in adult male) on inner edge.

Colour as described for male. Length 3.1 mm. Embryos 0.236 mm. in greatest diameter.

*Loc.* New South Wales: off Wata Mooli, 35 metres, and off Ulladulla, 75 metres (K. Sheard, July, 1943, and June, 1944).

The adult female of *repanda* is thus easily distinguished from that of *pala* by the single-jointed exopod of the third pereopod, the relatively longer pleon and the proportions of the endopod of the uropod, the second segment of this ramus being more than half as long as the first in *pala* (see fig. 3).

*Ovigerous female* (Garden Island, Western Australia). Differs from the female described above as follows. The size is smaller, the total length only 2.4 mm. The carapace is less swollen, being deeper than wide, and like the pedigerous somites has a more distinct longitudinal median dorsal carina, which nevertheless is low and rounded. The pleon is relatively slightly shorter, only one-fifth as long again as pedigerous somites together, and not quite half as long as the cephalothorax. The uropods are much shorter in relation to the total length of the animal and on the whole present an immature appearance; the first segment of the endopod is only two and one-third times as long as second (see fig. 3). The pigmentation is reduced to a couple of chromatophores on the carapace, one on each side of mid-line of dorsum, just behind middle of length. The ova are 0.2 mm. in diameter.

*Adult male* (Garden Island, Western Australia). Slightly larger (3.5 mm.) than the males from the Pacific coast of Australia, but otherwise differing little. The peduncle of the uropod is relatively slightly longer, being more than half as long as the endopod. The last-named may have only two spines near the distal end of the inner margin of the first segment, and anterior to this the margin bears long plumose setae; the second segment has the usual six inner spines. The pleon, as in the New South Wales type, is more than two-thirds as long as the cephalothorax, and the proportions of the segments of the endopod of the uropod are the same.

## GEPHYROCUMA SIMILIS sp. nov.

*Ovigerous female.* General form as in the other two members of the genus.

Carapace deeper than wide, fully one-third as long as total length of animal, and with a low, median rounded dorsal carina.

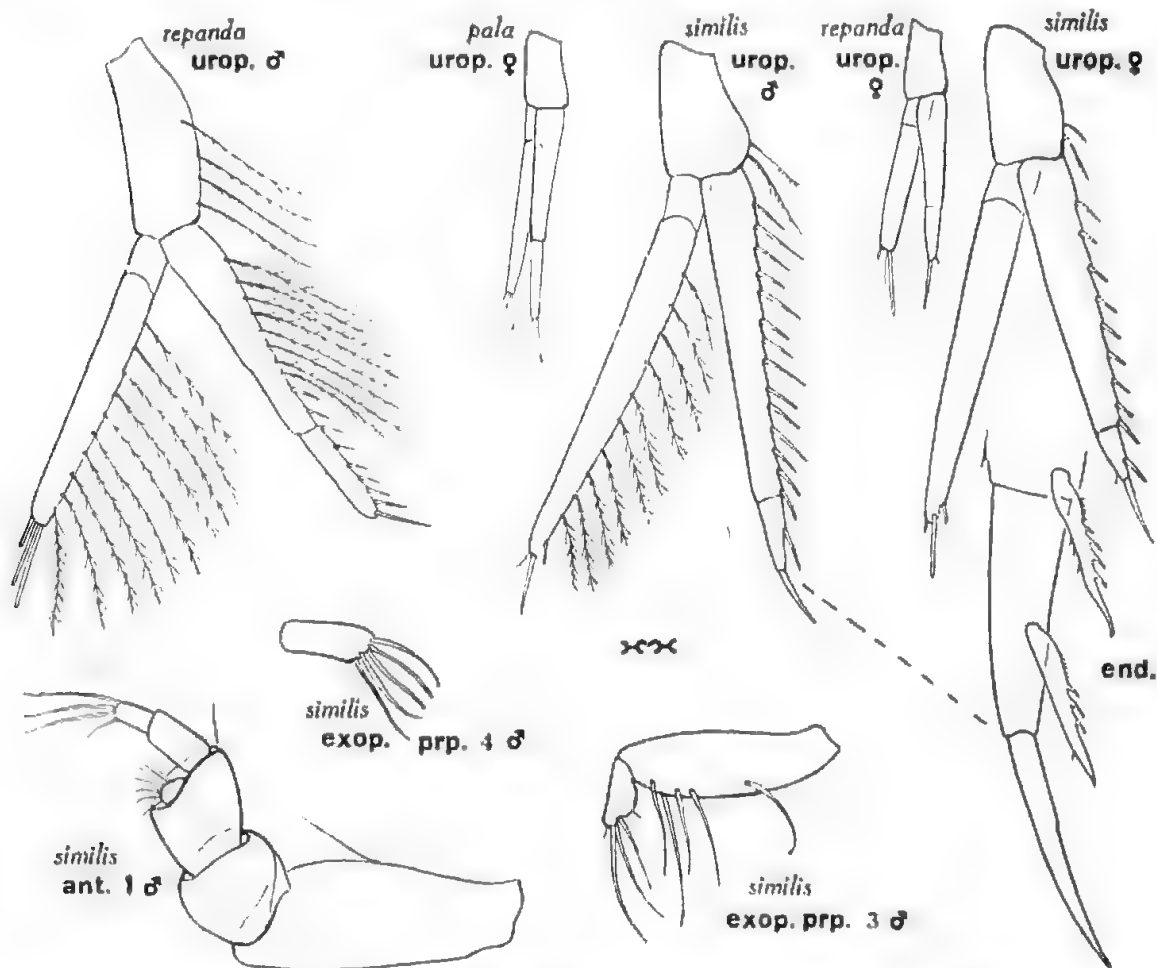


Fig. 3. *Gephyrocuma similis*; urop., uropods of types adult male, 2.8 mm., and ovigerous female, 3.1 mm. ( $\times 86$ ); end., distal segment of endopod ( $\times 380$ ); ant. 1, first antenna of male ( $\times 172$ ); exp. prp. 3-4, exopods of third and fourth pereopods of male ( $\times 172$ ).

*G. repanda*; urop., uropod of ovigerous female, 2.4 mm., and adult male, 3.5 mm., from Garden Is., W. Aust. ( $\times 86$ ). *G. pala*; urop., uropod of ovigerous female, 2.4 mm., from S. Aust. ( $\times 86$ ).

Pedigerous somites together five-sevenths as long as carapace. Pleon more than half as long again as pedigerous somites together and nearly two-thirds as long as cephalothorax.

Pereopods as in *pala*, the third pair with exopods consisting of two distinct segments, the fourth with unisegmentate exopods.

Peduncle of uropod one-half as long as first segment of endopod, which is a little shorter than exopod; inner margin of first segment of endopod with nine simple spines; second segment only one-fifth as long as first, with one inner spine and a distal spine which is one-third as long again as the segment.

Colour: translucent with a few scattered chromatophores. Length 3.1 mm.; ova 0.15 mm.

*Adult male.* Carapace one-third of total length of animal, deeper than wide and shaped as in *repanda*.

Pedigerous somites together five-sevenths as long as carapace. Pleon nearly twice as long as pedigerous somites and fully three-fourths as long as cephalothorax.

Peraeopods as in female. Peduncle of uropod less than half as long as first segment of endopod, which is almost as long as exopod; inner margin of first segment with fourteen irregular, curiously serrated spines (fig. 3, end.); second segment less than one-fourth as long as first, with one serrate inner spine and a simple terminal spine as in female.

Colour as in female. Length 2.8 mm.

*Loc.* Western Australia: Shark Bay, west of Cape Peron, 3 fathoms (G. P. Whitley, ex "Isobel", submarine light, surface temperature 18.55° C., August, 1945). Types in South Australian Museum, Reg. No. C. 3005 and 3222.

At first glance it might appear that the adults described above represent a form or race of *pala* in which the individuals have undergone more ecdyses than the shore-dwelling South Australian material, which includes egg-bearing females. It has been suggested that this may have happened in the case of *Dimorphostylis subaculeata* and its var. *praecox* (Hale, 1945, p. 185). In the case of *Gephyrocuma similis*, however, the proportions of the segments of the endopod of the uropod do not support such theory. The adult of *repanda* attains a total length of over 3 mm. but may be egg-bearing at 2.4 mm.; as noted above, in a small ovigerous female the first segment of the endopod of the uropod, in relation to the second joint, is approximately two-thirds as long as in an example 3 mm. in length. In a 2.4 mm. ovigerous female of *pala* the endopodal segments are 8:5 and on this basis should be at most 12:5 in the Shark Bay specimens if they were referable to *pala*, whereas in the ovigerous female of *similis* it is 25:5.

The armature of the uropods of *similis* is distinctive and the pleon is much longer in both sexes than in *pala*.



## Genus LEPTOCUMA Sars.

## LEPTOCUMA PULLEINI Hale.

*Leptocuma pulleini* Hale, 1928, p. 38, fig. 7-8; and 1936, p. 409; and 1944, p. 253, fig. 19-20.

A male taken by I. S. R. Munro at Noosa River, Queensland, extends the distribution of the species; its known range on South and Eastern Australian coasts is now between lat. 27.2 S. and 35.50 S.

## LEPTOCUMA SERRIFERA Hale.

*Leptocuma serrifera* Hale, 1944, p. 261, fig. 24-25.

Originally described from one locality in New South Wales, the species proves to be not uncommon in Western Australia (Airlie Island off Onslow; Port Hedland and Esperance Bay, etc.). In the female the exopod of the uropod bears short, compound setae on the inner margin, not plumose setae as before stated.

## LEPTOCUMA NICHOLLSI sp. nov.

*Ovigerous female.* Carapace robust, as wide as deep, and barely half as long again as deep; it is one-fourth of total length of animal; median dorsal carina sharply defined for anterior three-fourths of its length. Ocular lobe wider than long, only slightly pigmented and with lenses ill-defined. Antennal notch wide and angle very obtuse.

The five pedigerous somites together are longer than carapace and rather more than half as long as pleon.

Pleon, like pedigerous somites, smooth and, excepting fifth, subequal in length.

First peraeopod with carpus reaching to level of front of pseudorostral lobes; basis shorter than combined lengths of remaining joints, with a long seta at external angle and with four serrate spines, successively increasing in length backwards, and followed by a row of plumose setae of which also the proximal ones are longer than the others; dactylus long, almost as long as propodus, and slightly longer than carpus, which is equal in length to merus.

Second peraeopod reaching to about middle of length of merus of first leg; basis distinctly shorter than rest of limb, with plumose setae on both margins; carpus half as long again as ischium and merus together; propodus about two-thirds as long as dactylus and less than half as long as carpus.

Third to fifth peraeopods each with three distal carpal setae, at least the last two of which, together with the propodal seta, reach beyond tip of dactylus.

Peduncle of uropod slender, about one-third as long again as telsonic somite, and one-fourth as long again as the subequal rami; its inner margin is armed with seven stout spines, none differing markedly in length from the others; first joint of endopod half as long again as second, its inner margin with nine spines, four short followed by one longer at middle of length; beyond the latter are three short spines and a longer spine at distal end; second joint with four spines on inner margin, and with three compound setae at distal end; the middle (and most terminal) of these setae is as long as the joint, the inner one is half as long as this, while the outer is very short. Exopod with compound setae on both margins and distal end of second joint; the longest of the terminal setae is more than half as long as the exopod.

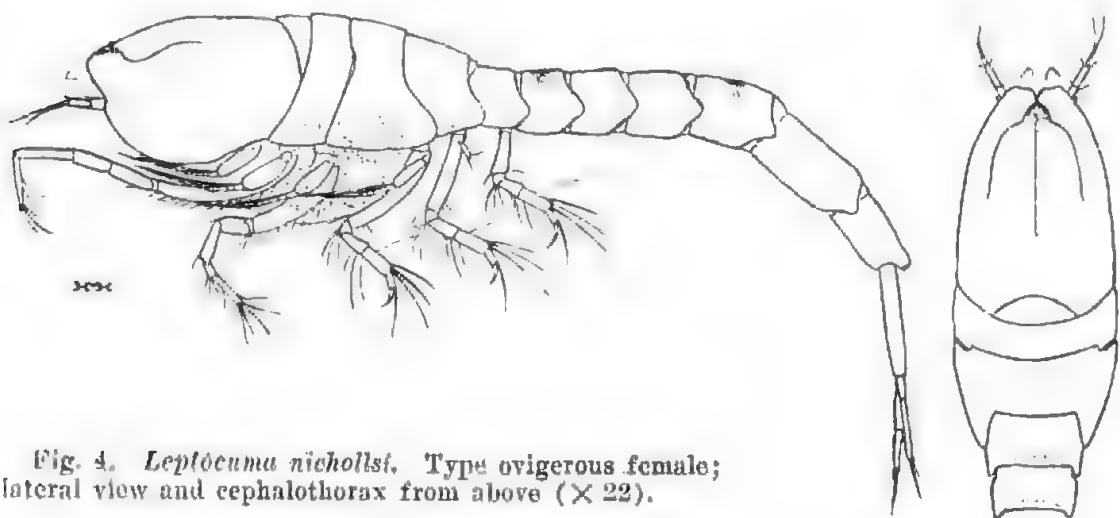


Fig. 4. *Leptocumma nichollsi*. Type ovigerous female; lateral view and cephalothorax from above ( $\times 22$ ).

Colour: translucent, except for a transverse dorsal brown marking on first and fourth pleon somites. Length 4.1 mm.; ova 0.2 mm.

*Adult male.* Carapace more than one-fourth of total length of animal, as wide as deep, and nearly half as long again as deep. The pseudorostral lobes do not extend forwards quite as much as in the mature female and are more widely separated. The ocular lobe is, as usual, larger and is more strongly pigmented, while the antennal notch is represented by a very shallow indentation.

The five pedigerous somites together are half as long as the pleon and almost as long as the carapace.

The peraeopods are much as in the female and the basis in the first pair similarly has four conspicuous serrate spines at distal fourth of inner margin.

Uropod relatively longer than in female; peduncle two-thirds as long again as telsonic somite, fully one-fourth as long again as the subequal rami, and with fourteen spines on inner margin; first joint of endopod half as long again as second; armature of rami as in female but the spines and setae are longer.

The first pleon somite has three dark brown chromatophores, arranged in a transverse line on the dorsum, and the fourth somite has two similar spots. In addition there is a pair of small dark chromatophores on the back of the carapace; otherwise the animal is translucent. Length 4.25 mm.

*Loc.* Western Australia; Garden Island, Careening Bay, 3 fathoms (A. G. Nicholls, submarine light, November, 1946). Type female and allotype male in South Australian Museum, Reg. No. C. 3072 and 3075.

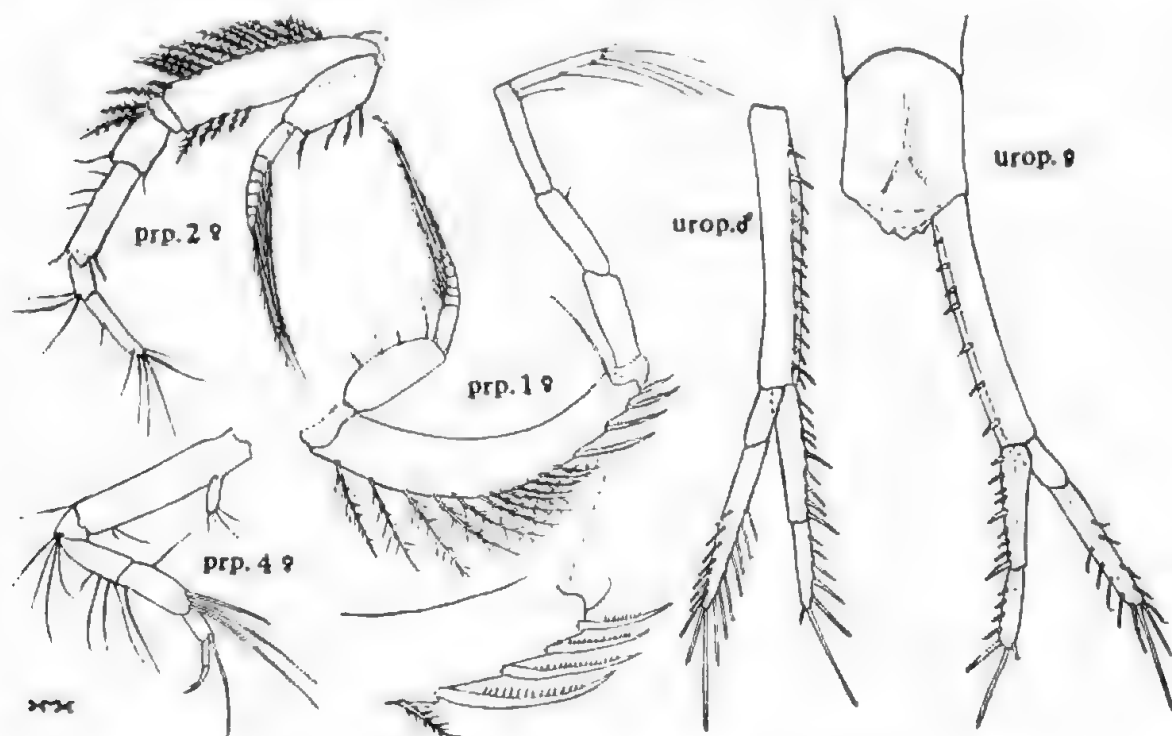


Fig. 5. *Leptocuma nichollsi*. Types ovigerous female and adult male; prp. 1, 2 and 4, first, second and fourth peraeopods ( $\times 48$ ; basis of first leg,  $\times 92$ ); urop., uropods, etc. ( $\times 48$ ).

The types, together with eight adult males and five immature examples, were taken from a series of hauls made on the night of November 26–27, by Dr. A. G. Nicholls (after whom the species is named) and some of his students.

The four serrate spines at the distal end of the basis of the first peraeopod are constant in immature specimens as well as in adults. The dark markings on the first to fourth pleon somites are present in all examples, though the chromatophores may vary in number. The number of the colour cells on the carapace also varies, but not many are present in any of the material.

In the key to Australian species of the genus (Hale, 1944, p. 253) *nichollsi* would fall into the second section together with *abstipa*, *serrifera*, *sheardi* and *intermedia* were it not for the fact that there are four, instead of two, serrate

spines at the distal end of the inner margin of the first peraeopod. It differs from all the aforementioned species but *serrifera*, however, in that the second joint of the endopod of the uropod is much more than half as long as the first segment. In most other features it resembles *serrifera*, but may be separated by the character of the uropods (longer peduncle, and different armature of it and the endopod of the appendage) and the proportions of the joints of the first peraeopod.

Genus VAUNTHOMPSONIA Bate.

VAUNTHOMPSONIA NANA Hale.

*Vaunthompsonia nana* Hale, 1944, p. 266, fig. 28-29.

This species was described from a male 1.9 mm. in length, with the anterior peraeopods mutilated; as mentioned, it closely resembled *V. arabica* Calman (1907, p. 29, pl.vii, fig. 20-24), differing mainly in the smaller size and shape of the carapace.

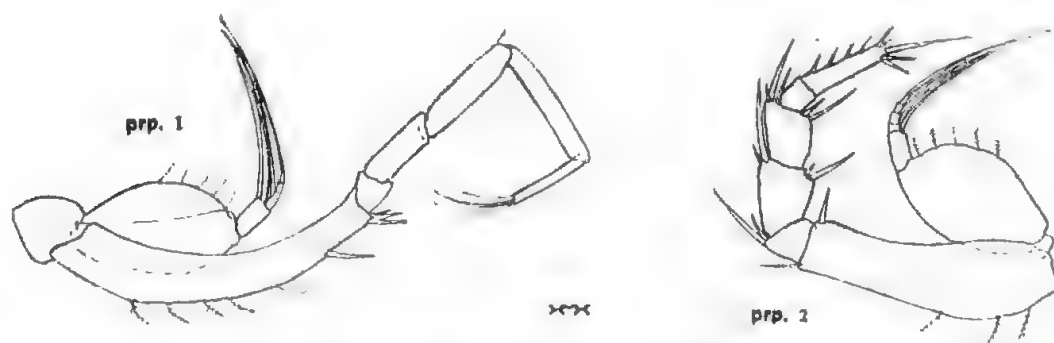


Fig. 6. *Vaunthompsonia nana*. First and second peraeopods of 3.1 mm. adult male from Western Australia ( $\times 60$ ).

Some further males from Western Australia raise doubts as to whether the South Australian type of *nana* should be regarded as a dwarf variety of *arabica*. The Western Australian males are larger than the type of *nana*, being 3.1 mm. to 3.4 mm. in length, and possess first and second peraeopods as illustrated for *arabica* (cf. fig. 5; and Calman, fig. 22 and 23), while the uropods also are very similar. The carapace, however, has the dorsal margin less arched than shown in Calman's fig. 20, and is as illustrated for the type of *nana* (Hale, 1944, fig. 28); Calman remarks of the carapace of his *arabica*, "seen from the side the dorsal edge is distinctly arched.... This species is very closely allied to *V. cristata*, but it appears to differ in a number of small characters, of which the convex dorsal edge of the carapace and the shorter first legs are the most

conspicuous.” For the present it seems desirable to regard the Australian material as representing a form separable from *arabica* (Suez and Aden).

The Western Australian specimens were taken at Garden and Rottneest Islands, and at Esperance Bay. In all the pseudorostral lobes meet for a short distance in front of the eye-lobe (a condition not completely in accord with Stebbing's definition of *Vaunthompsonia*). The carapace has a faint median dorsal carina.

#### Genus SYMPODOMMA Stebbing.

*Sympodomma* Stebbing, 1912, p. 138, and 1913, p. 15; Hale, 1944, p. 284.

As previously noted (Hale, *ut supra*), five species are included here. The adult male is known in only two of them, *weberi* (Calman) and *australiensis* Foxon; in the case of *anomala* (Sars) the female alone has been described. A sixth species (from Western Australia) is here referred to the genus, but unfortunately this new form is represented only by adult males; further, the South Australian specimens previously referred to *S. africanus* Stebbing are now regarded as representing a distinct species.

*Glyphocuma* Hale (1944, p. 268) is close to *Sympodomma* and is separated mainly by a male character—the presence of an exopod on the fourth peraeopod, in that sex only, this being absent in the male of *Sympodomma*; for this reason a combined key of all the species placed in the two genera is given below. Because of the sexual dimorphism exhibited in the species referred to *Glyphocuma* and as it is probable that this occurs also in *Sympodomma*, the character of the dorsal crest of the carapace, an important distinguishing feature in females and young males, is necessarily ignored, but the key is based on details readily observable without dissection.

Stebbing does not designate or indicate a genotype for *Sympodomma*. It might be said that his *S. africanus* (the first-mentioned of the species which he groups as belonging to the genus) is excluded as a genotype because it is a “species which the author of the genus doubtfully referred to it” (Int. Rules Zool. Nomenclature, Art. 30, ii, e). Stebbing gives as the main distinguishing character of the genus, within its group, the presence of exopods on the first three pairs of peraeopods in both sexes, but later states that in the type young male of *S. africanus* “Exopods to the third pair were not satisfactorily made out;” no exopod on the third peraeopod is indicated in his figure.

In the circumstances *Heterocuma diomedea* Calman (1912, p. 612, fig. 6–9) is now designated as the genotype of *Sympodomma*.

KEY TO THE SPECIES OF *SYMPODOMMA* AND *GLYPHOCUMA*.

1. First joint of endopod of uropod not longer than second .. .. 2  
 First joint of endopod of uropod at least one and one-half times as long as second .. .. 6
2. Ocular lobe with two tiny divergent teeth at anterior end *S. anomala* (Sars) .. .. 3  
 Ocular lobe with at most one median point at anterior end .. .. 3
3. Endopod of uropod longer than exopod .. .. *S. whitleyi* sp. nov. .. .. 4  
 Endopod of uropod not longer than exopod .. .. 4
4. Front of ocular lobe produced to a point .. .. *G. bakeri* (Hale) .. .. 5  
 Front of ocular lobe rounded .. .. 5
5. Peduncle of uropod twice as long as exopod. Endopod of uropod shorter than exopod and with its first joint equal in length to second .. .. *S. diomedea* (Calman) .. .. 6  
 Peduncle of uropod distinctly less than twice as long as exopod. Endopod of uropod at least as long as exopod and with its first joint shorter than second .. .. *G. inequalis* Hale .. .. 6
6. Front of ocular lobe produced to a point .. .. 7  
 Front of ocular lobe rounded .. .. 8
7. Ocular lobe at most barely longer than wide, with lenses extending to base .. .. *G. serventyi* Hale .. .. 8  
 Ocular lobe elongated, eye present at the extremity .. .. *S. australiensis* Foxon .. .. 8
8. Endopod of uropod slightly longer than exopod .. .. *S. africana* Stebbing .. .. 9  
 Endopod of uropod a little shorter than exopod .. .. 9
9. Form slender. First peraeopod with the propodus fully as long as combined lengths of ischium, merus and carpus. Peduncle of uropod more than half as long again as either exopod or telsonic somite .. .. *S. weberi* (Calman) .. .. 10  
 Form rather robust. First peraeopod with the propodus only about two-thirds as long as combined lengths of ischium, merus and carpus. Peduncle of uropod less than one-fourth as long again as exopod and little longer than telsonic somite .. .. 10
10. Pleon smooth laterally. External apical lobe of basis of third maxilliped not extending beyond distal end of merus .. .. *G. dentata* Hale .. .. 11  
 Pleon with dorso-lateral, lateral and infero-lateral carinae. External apical lobe of basis of third maxilliped extending beyond distal end of merus .. .. *S. (?) incerta* sp. nov. .. .. 11

## SYMPODOMMA WHITLEYI sp. nov.

*Adult male.* Integument well calcified. Carapace slender, fully one-fourth of total length of animal, barely deeper than wide, and more than twice as long as deep; surface smooth except for a distinct median dorsal carina, which

exhibits no indication of serrations; dorsal margin, as seen from side, almost straight. Antennal notch obliterated and angle very obtuse. Ocular lobe partly pigmented, barely longer than wide, none of the somewhat indistinct lenses projecting posteriorly beyond its hinder limits; in front the lobe has an almost imperceptible median projection. Pseudorostral lobes reaching apex of ocular lobe, and with anterior margins smooth.

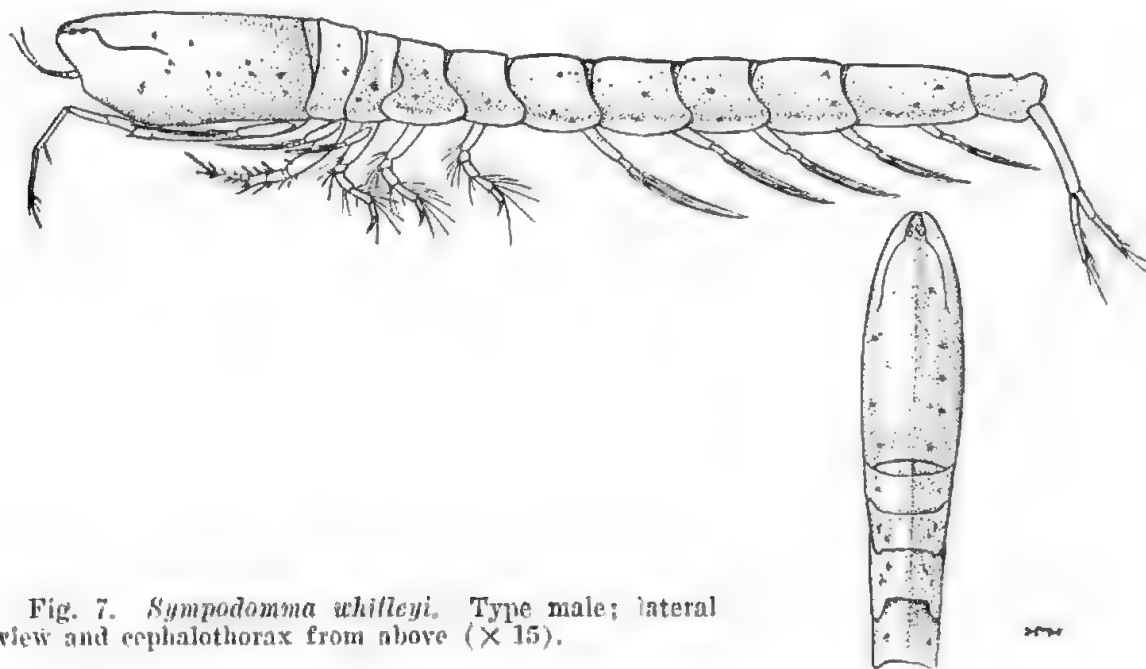


Fig. 7. *Sympodomma whitleyi*. Type male; lateral view and cephalothorax from above ( $\times 15$ ).

Pedigerous somites together not as long as carapace and less than half as long as pleon; each somite with an ill-defined median dorsal carina; antero-lateral angle of second overlapping carapace slightly, that of third overlapping second; laterally the fourth overlaps the third anteriorly and the fourth posteriorly.

Pleon smooth except for a low median dorsal carina on each somite; telsonic somite about two-thirds as long as fifth, with distinct dorsal notch.

First peraeopod with carpus reaching slightly beyond level of antennal angle; basis slender, subequal in length to rest of limb, margined with plumose setae and with a few spines on proximal fourth of inner edge; ischium with a strong tooth at inner apical angle; carpus a little shorter than propodus, equal in length to dactylus and about one-third as long again as merus.

Well-developed exopods are present on the first to third peraeopods, but there is no trace of exopod on the fourth leg.

Basis of second peraeopod shorter than rest of limb and with two blunt apical "spines" (compound setae); merus and carpus subequal in length, each

shorter than dactylus, which is more than three times as long as propodus; the longest of the terminal dactylar spines is fully as long as the dactylus; other armature of the limbs is shown in fig. 7, prp. 2.

Outer slope of carpus of fossorial limbs with long setae, the three distal of which, together with the single propodal seta, reach well beyond tip of dactylus.

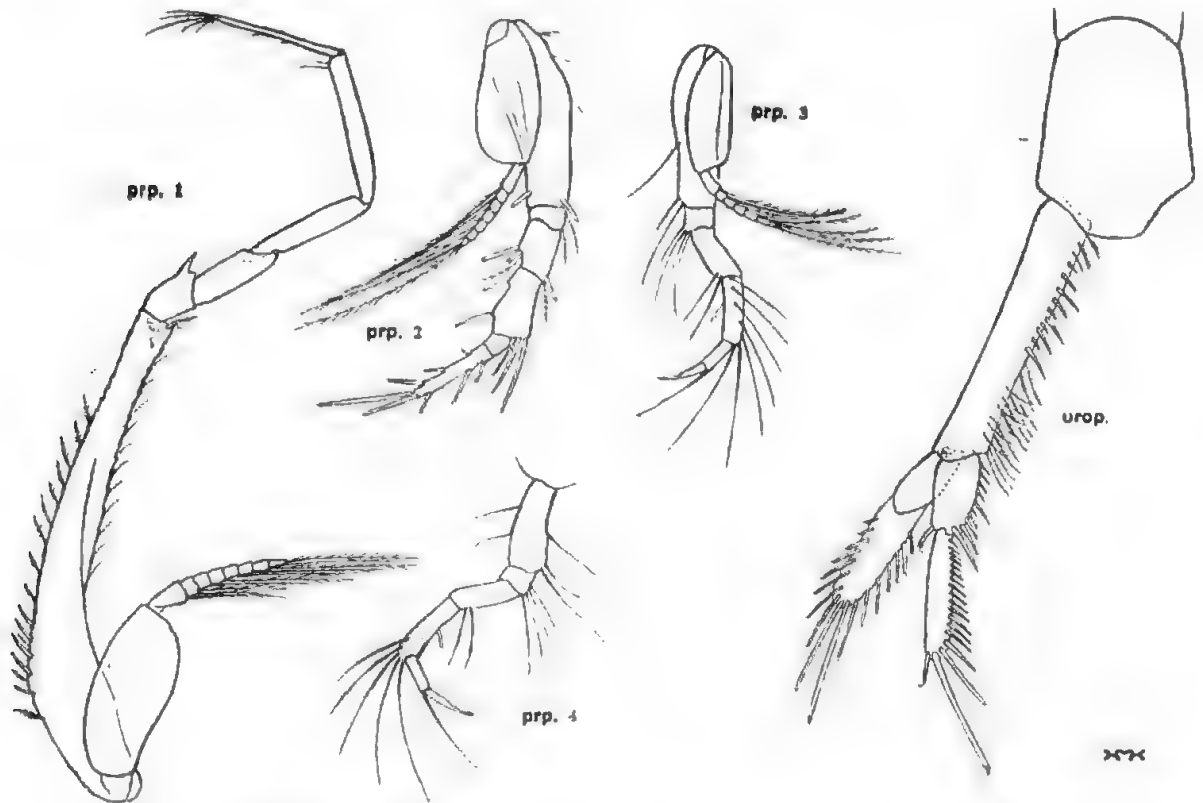


Fig. 8. *Sympodomma whitleyi*. Paratype male; prp. 1-4, first to fourth peraeopods; urop., telsonic somite and uropod ( $\times 40$ ).

Peduncle of uropod nearly one-third as long again as telsonic somite and one-third as long again as endopod, which is distinctly longer than the exopod; there are a few serrate setae on inner margin near proximal end, followed by ten spines, irregular in length, and in distal half two series of setae; first joint of exopod fully three-fourths as long as second, which is suboval in shape and is armed with stout compound setae on both margins, the longest of the apical ones being about as long as the joint; first joint of endopod fully two-thirds as long as second, armed on inner margin with ten spines, successively increasing in length between first and fifth, and between sixth (which is abruptly shorter than fifth) and tenth; there is a stout compound seta at outer apical angle; second joint with a row of fifteen spines on inner margin, successively increasing



in length; the rounded apex bears three compound setae, the longest of which is equal in length to the joint itself.

Colour white, with sparse black pigment spots as shown in fig. 7. Length 7.2 mm.

*Loc.* Western Australia: Shark Bay, Monkeymia, 2 fathoms, sand and weed bottom (G. P. Whitley, ex cutter "Isobel," submarine light, November, 1945, temperature 24.52° C.). Type in South Australian Museum, Reg. No. C. 3085.

In the closely allied genus *Glyphocuma* the male of *G. bakeri* somewhat resembles that of *S. whitleyi*; incidentally the two species were taken together in the submarine light trap noted above, *G. bakeri* being present in great number. *S. whitleyi* may be readily separated from the last-named, for, apart from the generic character, it is of smaller size, has the uropod of quite different proportions with endopod longer than exopod, while the eye-lenses do not extend posteriorly beyond the hinder limit of the ocular lobe.

SYMPDOMMA (?) INCERTA sp. nov.

*Sympdomma africanum* Hale (*nec* Stebbing), 1928, p. 40, fig. 9-10 and 1944, p. 284, fig. 30, D.

Unfortunately no further material of the southern Australian species formerly recorded by me as *S. africana* has come to hand; abortive attempts to collect additional specimens by Agassiz Trawl were made on several occasions over the area in St. Vincent Gulf on which the known examples were taken.

The inclusion of this form in the composite key given above necessitates its recognition, at least provisionally, as a species distinct from the African species of *Sympdomma*. As the male of *incerta* is unknown, its inclusion in *Sympdomma* is open to question; in fact, the feebly expanded merus of the third maxilliped, if it be a reliable generic indicator, suggests that the species may prove to be referable to *Glyphocuma*.

*S. africana* Stebbing (1912, p. 138, pl. 1) is known only from a subadult male and *incerta* from subadult females. Characters separating the Australian specimens from *africana* were noted previously (Hale, *ut supra*, 1928). At the time it was considered that the differences were due to age and sex, but subsequent examination of many more Cumacea has led to reconsideration of this view (Hale, *ut supra*, 1944).

It will be noted that in the above key, *incerta* falls close to *Glyphocuma dentata* but is separable by the features there detailed; as already noted the character of the dorsal crest of the carapace is ignored in this key. The females of the two species exhibit considerable difference in this respect, *dentata* having the crest cut into from nine to twelve teeth, while *incerta* has only four teeth,

the anterior three large, the last one tiny. However, in the case of *Glyphocuma bakeri* (which see herein) examples from Shark Bay (lat. 25.30 S.) have fewer dorsal serrations than are found in southern Australian specimens (lat. 34.5 S. to 38.21 S.).

Genus GLYPHOCUMA Hale.

GLYPHOCUMA SERVENTYI Hale.

*Glyphocuma serventyi* Hale, 1944, p. 280, fig. 37-38.

This species was known previously only from the Pacific Coast of Australia. Examples are now available from Careening Bay, Garden Island, in Western Australia.

GLYPHOCUMA BAKERI Hale.

*Sympodomma bakeri* Hale, 1936, p. 396, fig. 3-4.

*Glyphocuma bakeri* Hale, 1944, p. 270, fig. 31-32.

A large number of examples, mostly males, were taken at three localities in Shark Bay, Western Australia, by G. P. Whitley, in November, 1945, by

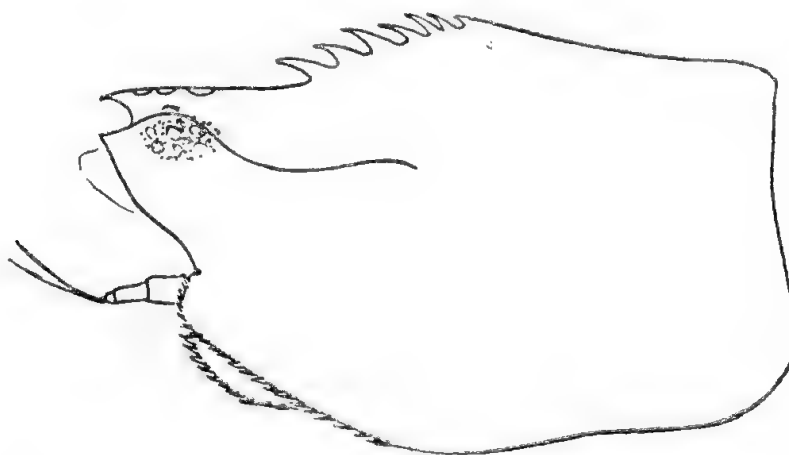


Fig. 9. Carapace of immature female of *Glyphocuma bakeri* from Shark Bay, showing robust form and relatively large teeth of dorsal crest ( $\times 44$ ).

means of submarine light traps, in 2-3 fathoms on sandy and weedy bottoms. The adult males, 9.2 mm. to 10 mm. in length, are as described previously (Hale, 1944), but the females, adults and immature examples, differ from females taken in southern Australia, in having only six or seven serrations in the anterior half of the crest of the carapace, these teeth being larger than in the southern examples; those of an immature female (fig. 8) are still larger than

those of the mature Shark Bay females. This young female, 7.25 mm. in length, has the carapace relatively much deeper than in older females and so, with its rather large dorsal teeth, superficially resembles the adult female of *G. dentata* (Hale, 1944, p. 273, fig. 33-34). The last-named, however, has smaller eyes, restricted to the anterior portion of the ocular lobe, the front of which is not produced to a point, the second joint of the endopod of the uropod is much shorter than the first, etc.

#### SUMMARY.

The paper deals with further Australian Bodotriidae, mainly from Western Australia. Apart from fifteen species of *Cyclaspis* (dealt with by the author in a previous paper) only two members of the family were formerly known from the Indian Ocean coast of Australia; nine species are added herein, including three which are described as new, viz. *Leptocuma nicholli*, *Gephyrocuma similis* and *Sympodomma whitleyi*.

A species recorded from South Australia as *Sympodomma africana* Stebbing is now regarded as distinct and the name *Sympodomma* (?) *incerta* is proposed for it.

A composite key to the species of *Sympodomma* and *Glyphocuma* is given.

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